Rolling stock requirements 2014-2019

An ATOC Overview

ATOC

Association of Train Operating Companies

Executive Summary

To inform the development of Ministers' High Level Output Specification (HLOS), and to provide support to the wider industry and its supply chain going forward, ATOC has been working with partners to develop a high-level rolling stock strategy. This approach has been welcomed and supported in the recent Command Paper as an important mechanism to support the delivery of improved value for money throughout the rail sector.

In the shorter-term, there is a need for a high-level overview of the likely requirements for rolling stock to support ongoing passenger growth, as well as the opportunities emerging from the significant infrastructure enhancements that will be delivered during Control Period 5.

This forecast is designed to support policy-makers through providing a view on future vehicle numbers, ages, types and the potential implications for costs going forward. This work will also help to guide suppliers and Government, including the Cabinet Office and the Department of Business, Innovation and Skills, regarding the size and nature of the 'pipeline' of future rolling stock construction, potential for life extension, and requirements for future re-engineering to meet technical and customer requirements.

Many of the opportunities identified in this document will be unlocked through the outcome of franchise competitions. The large number of franchises going into the market over the next two years will provide much greater certainty and clarity going forward as bidders seek to deliver affordable and efficient solutions to meet the requirements of passengers and funders.

This work builds on that undertaken by ATOC for the IIP[1], and is designed as an early input into the proposed national rolling stock strategy, outlined in Measure 3 of ATOC's 'Rolling Stock and Value for Money' Discussion Paper dated December 2011.

[1] Initial Industry Plan, September 2011

Methodology

To assess the required fleet numbers, we commissioned a consultant, Chris Kinchin-Smith, to engage with TOCs, ROSCOs[2], manufacturers and the wider supply chain. We developed a base position for April 2014, the end of Control Period 4, and then identified likely developments over the course of Control Period 5 (CP5) based on the options put forward in the IIP. The outcome of this process is attached as Appendix 1.

These forecast numbers for CP5 are estimates based around our understanding of the position at the end of March 2012. They are highly dependent upon decisions taken during the franchising process around service specification and are therefore indicative and subject to change and refinement as decisions become clearer. As this proceeds, there will be much more certainty both in terms of numbers and procurement options for TOCs, manufacturers and ROSCOs.

We identified five generic vehicle types:

- Short-distance diesel vehicles
- Medium-distance diesel vehicles
- Short-distance electric vehicles
- Medium-distance electric vehicles
- Intercity vehicles

In Appendix 1, aggregated TOC figures are shown for each of these five generic fleet types over the course of CP5 to April 2019, compared with the position at the end of CP4. We defined Low, Medium and High scenarios:

- Low – slower growth in passengers and no additional network enhancements beyond those already committed in CP4 (principally Thameslink, Crossrail and the infrastructure works to support the delivery of the IEP[3]) as well as the Edinburgh-Glasgow improvements programme;
- Medium – the central assumption where the above enhancements and those already announced (for example North Transpennine electrification) are implemented against the forecast growth in passenger numbers that underpinned the IIP; and
- High – further projects, such as Midland Main Line electrification are implemented, bringing further growth in demand.

The final columns of Appendix 1 show:

i. The forecast requirement for the total number of vehicles required by the end of the CP5 for each of the five generic fleet types, taking account of major projects (Thameslink, Crossrail, IEP), electrification, the need to address present levels of crowding, and future passenger growth;

ii. Forecast numbers of new vehicles to be built over the course of CP5, taking account of known commitments, the potential for existing vehicles to be cascaded and remain in service, other factors; and

[2] Rolling Stock leasing companies
[3] Intercity Express Programme

iii. The scale of any resulting surpluses or deficits, forecast to arise by the end of CP5, representing vehicles that could go off-lease, either for storage or for potential re-use beyond CP5 or for disposal.

To help with this work, we have held discussions with DfT, Network Rail, ROSCOs, manufacturers, and the Railway Industry Association (RIA) but this document has been prepared as ATOC's own viewpoint on the issues rather than attempting to draw a full industry consensus.

We intend to go forward through the development of a wider Rolling Stock Strategy, that we originally proposed, and which received support from Government in the recent Command Paper. The aim for the Strategy is to provide a guide to future opportunities, but it will not be prescriptive, and would be based around a 'plain vanilla' base and updated on a regular basis. The Strategy is intended to address whole-system issues including depots, interaction with infrastructure and signalling systems to support optimal decision-making across the industry.

Franchise bidders will of course develop and submit their own plans and ideas in their bids, and if these offer better value for money than the assumptions in the Rolling Stock Strategy, this will put them in a good position to win franchises. Open access operators are also a further source of supply and demand for rolling stock.

The principles for the strategy are set out in Appendix 4 to indicate the direction that we believe needs to be taken and we are intending to develop and refine them further with a view to preparing an initial strategy document by October 2012.

Continuous Service or New Construction?

As many as half of the GB-wide total of 18 franchises and concessions are ending by the end of 2014. A key element of the franchising procurement process will be for bidders to assess whether rolling stock requirements are best addressed through new builds or continued operation of existing vehicles, with or without refurbishment and re-engineering. Their assessments will take into account a number of factors, including costs, reliability, maintenance arrangements, the strategy for the implementation of ETCS[4], as well as financial and commercial issues. Bidders will be best placed to determine how they can optimise value for money across the whole range of TOC activities.

The IIP for England & Wales in section 8.3.2 debated the relative advantages of continuous operation and new construction, for fleets approaching a nominal term of use of 30 years for diesel trains and 35 years for electric trains. The case for new build will be strongest where new trains can demonstrate increased functionality or capability compared with the present trains, for example in terms of top speed, acceleration, capacity or energy consumption, and hence provide increased line capacity, increased revenue and/or reduced operating and maintenance costs which may offset their expected higher lease costs.

In Appendices 2 and 3 we list the fleets that will have reached the end of their nominal term of use, in the context of the IIP, by the end of CP5 and by the end of CP6 respectively.

Determining whether continued operation is appropriate will also be influenced by the incremental cost of providing PRM-TSI[5] compliance and ETCS functionality. Much will depend on the attractiveness of specifications and lease rentals for continued operation of current vehicles offered by ROSCOs measured against the capabilities and capital and financing costs of new trains. These trade-offs will be tested for many of the older fleets in the large number of franchise competitions over the next 2-3 years.

There are a number of viewpoints about the most likely direction of travel but it is clear that the best interests of the industry will be met through the re-letting process proceeding according to published schedules, as the DfT is doing, so that the commercial negotiations on new build versus continuous operation can take place as quickly as possible. While this takes place, we cannot be definitive on the balance between continued long-term use of existing fleets and new build that manufacturers, suppliers and leasing companies should built into their planning frameworks for CP5. This will become much clearer as the franchising process develops.

Our analysis is therefore based around the principles set out above. As part of the franchising process, further options may be explored. These could include conversion of existing units from diesel to bi-mode operation (for example the potential e-Voyager) or technological innovations such as tram-trains. We anticipate that bidders and funders will continue to put forward solutions that deliver best value.

[4] European Train Control system

[5] Persons with Reduced Mobility – Technical Standard for Interoperability

Planning for Growth in CP5

In forecasting the requirement for additional capacity in CP5 we have assumed:

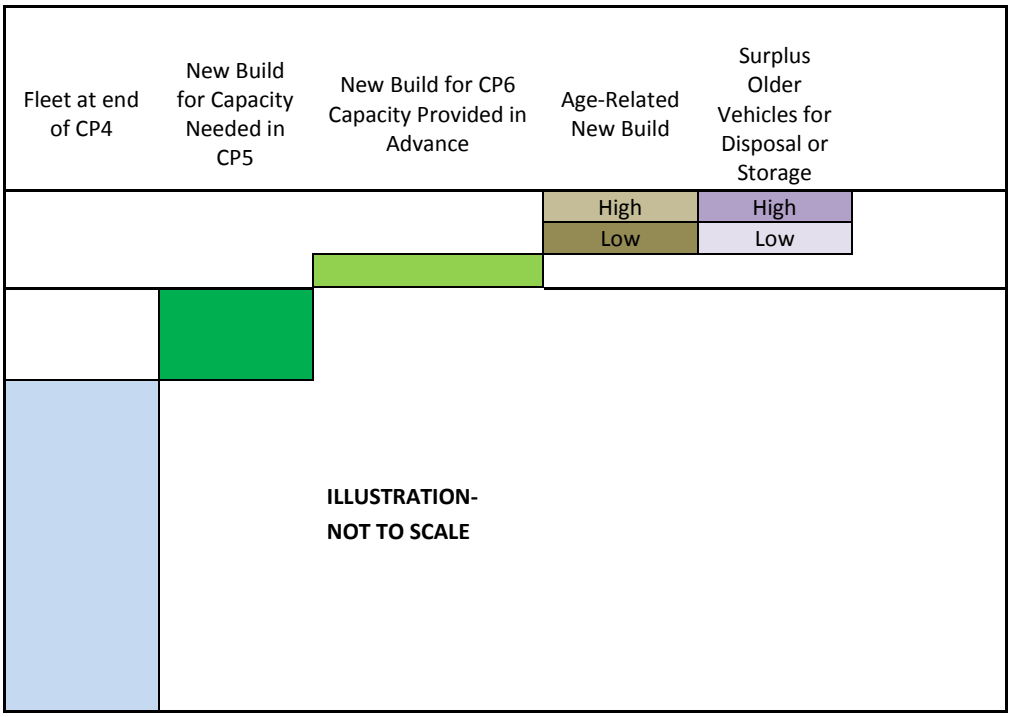
- Compound annual exogenous growth of passenger kilometres of 2.4% per annum, in line with the forecasts agreed by the industry for use in the Initial Industry Plan (although noting that current trends are higher than this, and will vary across the network);
- The need to increase capacity where significant overcrowding already occurs or is forecast to occur;
- Additional passenger growth stimulated by the Thameslink, Crossrail and IEP projects as well as the additional capacity to be provided by these projects to meet demand after 2019; and
- Additional growth to be stimulated by and capacity to be provided by electrification and associated vehicle cascades.

The principal drivers of fleet growth in CP5 are:

- Government-led procurements: Thameslink, Crossrail and IEP; and
- Competitively-driven procurements around refranchising: potential replacement of older long-distance fleets (such as High Speed Trains, InterCity 225 and Mark 3 vehicles), growth and replacement builds of EMUs to support electrification and continued expansion in passenger numbers, and the potential opportunities arising from cascades of existing fleets.

This is illustrated in the 'waterfall chart', Diagram 1 below, taking into account that current procurements provide additional vehicles to meet long-term demand beyond the end of CP5.

Diagram 1: Chart showing Relationship between Capacity Growth, New Construction of Vehicles, and Resulting Cascade out of Older Vehicles in CP5

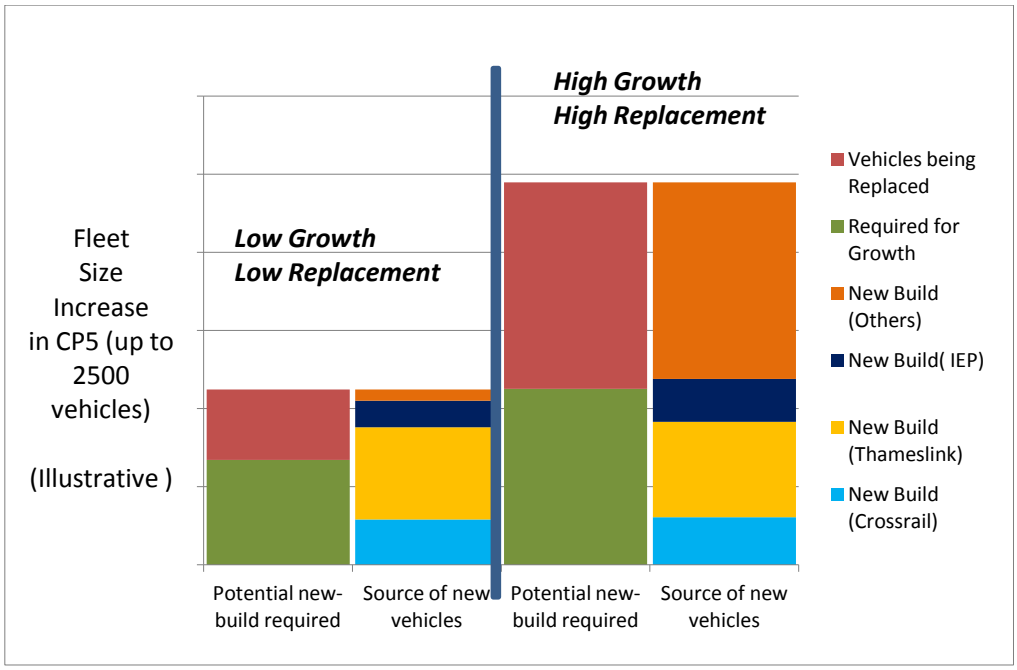


As set out in Appendix 1, we assume that there will be 12,258 vehicles in service in April 2014. In our Medium scenario, the total fleet size increases to 14,062 vehicles by the end of March 2019, a net increase of 1,804 vehicles. The Thameslink, Crossrail and IEP procurements will add, as a central estimate, around 2,500 vehicles to the fleet. On a like-for-like basis this will therefore displace around 700 vehicles. We identified 3,222 vehicles (Appendix 2) reaching the end of their nominal terms of use during CP5.

Therefore by the end of CP5, there will be around 2,500 vehicles required in the Medium scenario that would either be provided through new build or continued operation of existing rolling stock. Our analysis of the potential choices is therefore considered within this range. The potential build-up of the additional fleet requirements is illustrated further in the following chart, Diagram 2. In the high-growth, high-replacement scenario significant numbers of vehicles go off-lease and are replaced, in addition to the new construction already committed to support the delivery of major project outputs.

Franchise competitions, alongside the financial and manufacturing capability of the market, will determine the final outcomes. Our starting planning assumption has been that between 20% and 60% of vehicles reaching the end of their nominal terms of use would be replaced during CP5 – so around 500-1,500 new vehicles could be procured. These numbers will become more refined over forthcoming franchise competitions.

Diagram 2: Chart showing Relationship between Vehicles built for Capacity Growth and for Fleet Replacement, for two Alternative Scenarios in CP5



Conclusions

A number of findings have emerged from our analysis of requirements in CP5. These are:

a) The national fleet is currently forecast to grow from 11,851 vehicles at present to 12,258 vehicles by the end of CP4 as a result of known and planned additional vehicle orders, and then into a range between 13,601 and 14,512 vehicles by the end of CP5. This equates to fleet growth of between 11% and 18% over the five year period of CP5.

b) There are already significant new vehicle orders in place that will be delivered into service in CP5. Government is leading the procurement of rolling stock for Crossrail, Thameslink and IEP in CP5, in total expected to be in the range of 2,100 to 2,900 new vehicles. The principal uncertainty within this relates to the size of the proposed IEP contract. At one time this was assumed to comprise more than 1,000 vehicles but we understand that the initial order is now likely to be for the construction of approximately 550 vehicles, for HST replacement on the Great Western and East Coast Main Lines. The nature of the IEP procurement is that the supplier determines how many vehicles are required to meet the availability specification, so precise numbers will depend upon the plans made for maintenance and reliability of the fleet.

c) TOC requirements for new vehicles, to support growth and the delivery of new capacity and electrification, and replacement of current fleets, will be driven through franchising and through commercial deals. Our estimate is that the most likely requirements for additional vehicles will be in the range of between 500-1,500 vehicles during CP5, with a maximum potential range between 200-2,500 vehicles, assuming either continued operation of

virtually all the existing fleet or a much larger volume of new build. The final number of vehicles will be determined through commercial transactions. The lower figures assume that ROSCOs will be able to offer attractive specifications for continuous operation and competitive lease rentals for practically all older fleets. At the higher end of the range we assume that a much larger proportion rolling stock reaching the end of its nominal term of use will be displaced.

d) Requirements for EMUs for electrification and growth in the North West, Great Western, North Transpennine and South Wales areas could be met by cascading vehicles from the Thameslink and Crossrail routes but some new-build options may provide additional capability and value.

e) On an increasingly capacity-constrained railway, and in particular on the main radial routes shared with long-distance services, one emerging option is for the introduction of a high-acceleration, higher-speed commuter EMU to make optimum use of route capacity without major route infrastructure spend. This EMU might be based on existing rolling stock types but could differ from it as well, depending on the capability and commercial terms that bidders negotiate with suppliers and financiers. A potential deployment is between Paddington and Oxford and Newbury; similar opportunities may exist on other strategic routes. Some development work on train/OLE[6] interfaces may be necessary, but this approach would give journey time benefits to passengers as well as providing a better fit with 125mph longer-distance trains, including IEP, on such routes.

f) As a result of electrification, and after making allowance for fleet growth to address crowding, there could be a 'surplus' of shorter distance DMUs by the end of CP5 (between 224-249 vehicles). This may be compared with the size of the present Pacer fleet of 290 vehicles. The surplus will most likely comprise older vehicles that may have limited future opportunities for further leasing.

g) If sufficiently attractive refurbishment and re-engineering specifications and lease rentals are on offer, there could be an economic case for continued operation of all or most of the Class 150, 153, 155 and 156 fleets, and also for some Class 14x units. This could be influenced by decisions on the likely location and timing of future electrification schemes, as well as the deployment proposals for ETCS.

h) There will be no significant surplus or shortage of middle-distance DMUs by the end of CP5. Growth requirements on diesel routes will potentially be met through a cascade of DMUs displaced by North Transpennine electrification.

i) As a result of the Crossrail fleet introduction and other factors, there could be a 'surplus' of the older short distance EMUs by the end of CP5 (between 16-538 vehicles), after making allowance for fleet growth to address crowding. Some of the displaced Class 315 vehicles might be retained to provide additional peak capacity on the Great Eastern main line. Across London and the South East, the surplus vehicles will be older and it will be a commercial and affordability decision as to whether there is a case for continuous operation for example to provide further capacity to address crowding. Significant numbers of EMUs

[6] Overhead line electrification

in some or all of classes 317, 319, 321, 365 and 377 will be displaced by the new Thameslink fleet. The resulting cascade will provide the principal source of vehicles for electrified regional services, and for growth in the L&SE region. With the present range of growth assumptions used in this exercise, there could be a surplus of between 124-216 such vehicles by the end of CP5 comprising between 1 and 2% of the vehicles of this type.

j) Large numbers of HSTs will be displaced from the GWML and ECML assuming that the initial IEP contract of around 550 vehicles is signed. If the IEP order is no greater than this, HSTs will however continue to operate beyond CP5 on parts of the GWML and on other routes, for which refurbishment and re-engineering works would be required. Cancellation or major delay to IEP would require a fall back strategy for intercity services on the electrified GWML. The 'surplus' of vehicles in this category is likely to consist of HST and Mark III vehicles built in the 1970s and 80s; they could potentially be redeployed to address crowding hotspots elsewhere but again the question of whether there is a business case to maintain them in front-line service will need to be addressed.

k) A surplus of rolling stock could be of benefit in terms of helping TOCs to secure competitive lease rentals, but it could also provide availability cover for ETCS fitment in the latter years of CP5 and in CP6 as well as capacity for growth.

l) Cancellation or major delay to the Thameslink or Crossrail fleets would delay the cascade of EMUs to other routes which are being electrified or which need additional capacity for growth.

m) Further opportunities for cascade and/or new build vehicles may emerge if a decision is taken to electrify some or all of the Midland Main Line.

n) Even if a pragmatic approach continues to be taken on PRM-TSI compliance work, e.g. for a residual Pacer fleet, there could be a peak of activity in 2017-2019. The supply side of the industry will need to increase capacity to cope with this peak, and for supporting continued operation of existing vehicles. The option of seeking a change to the law to permit a longer timescale for these modifications, or to permit further review of PRM-TSI scope for vehicles with a short life expectancy and/or very low use, is one that may be worth pursuing.

o) ETCS is not seen as the major driver of rolling stock strategy in CP5. Within CP5, the currently assumed programme of ETCS route fitment is relatively modest, but includes the removal of signals on the south end of the ECML. Fitment of 'first of class' of fleets for some subsequent routes will also be required. The benefits of transferring Class 16x (Networker Turbo) units from the Thames Valley (after electrification) to the west of England in place of Class 14x and 15x units is a possibility that might be assessed in the Great Western franchise process. For some fleets (e.g. the Class 313s on Great Northern inner suburban services, if this fleet is retained by the next franchisee) there will be merits in considering whether ETCS fitment, required upgrading and PRM-TSI work might best be carried out simultaneously.

Appendix 1

High level Rolling Stock Strategy: Forecast Fleet Size Changes for CP5 ('Summary Sheet 1')

	Present		Committed, End of CP4		Forecasts, End of CP5			Forecasts, CP5 Changes			Forecasts, CP5 Changes		
Sub-Group and Class	Number of Units/ Trainsets	Number of Vehicles	Number of Units/ Trainsets	Number of Vehicles	FORECAST OF TOTAL REQUIREMENT FOR VEHICLES BY SUB-GROUP, END OF CP5			FORECAST OF NEW-BUILD VEHICLES BY SUB-GROUP, DURING CP5			FORECAST OF NET SURPLUS VEHICLES BY SUB-GROUP, DURING CP5 (-VE IS SURPLUS)		
	Period 10 2011/12		Period 13 2013/14		LOW	MEDIUM	HIGH	LOW	MEDIUM	HIGH	LOW	MEDIUM	HIGH
A. Shorter Distance Diesel Sub-Total	**539**	**1,047**	**539**	**1,047**	**805**	**798**	**823**	**0**	**0**	**0**	**-242**	**-249**	**-224**
B. Middle Distance Diesel Sub-Total	**508**	**1,329**	**509**	**1,336**	**1,328**	**1,352**	**1,370**	**0**	**0**	**0**	**-8**	**16**	**34**
C. Shorter Distance Electric Sub-Total	**643**	**2,336**	**643**	**2,336**	**2,873**	**2,950**	**2,974**	**580**	**630**	**1,176**	**-43**	**-16**	**-538**
D. Middle Distance Electric Sub-Total	**1,255**	**4,737**	**1,305**	**4,999**	**6,107**	**6,319**	**6,591**	**1,324**	**1,444**	**1,748**	**-216**	**-124**	**-156**
E. Intercity Sub-Total	**296**	**2,402**	**304**	**2,540**	**2,488**	**2,643**	**2,754**	**340**	**672**	**1,272**	**-392**	**-569**	**-1,058**
TOTALS	**3,241**	**11,851**	**3,300**	**12,258**	**13,601**	**14,062**	**14,512**	**2,244**	**2,746**	**4,196**	**-901**	**-942**	**-1,942**

Source: ATOC analysis based on franchise-specific inputs. All numbers are provisional.

Note: The third column group reflects the net change in fleet size at the end of CP5. Assumptions on electrification and passenger growth vary across the three high-level scenarios and affect the balance between sub-groups of vehicles.

Appendix 2

BR Fleets Reaching Nominal Life Expiry in CP5 (30 Years for Diesel Fleets and 35 years for Electric Fleets)

Class and Build Dates	Fleet Size (Vehicles)	Comments
Classes 142, 143 and 144 (75 mph Pacer DMU fleets, Sub-Group A) Built 1985 – 1987. 30-year life reached in 2015 to 2017 (CP5)	290	Many likely to be displaced by electrification (or resulting cascades) on Great Western, the Welsh Valleys, and the North West. Some however might remain in service on low-mileage diagrams and on low revenue routes, subject to refurbishment, re-engineering and PRM-TSI.
Classes 150, 153, 155 and 156 (75 mph Sprinter DMU fleets, Sub-Group A) Built 1985 – 1989. 30-year life reached in 2015 to 2019 (CP5)	580	Some will be displaced by electrification (or resulting cascades) on Great Western, the Welsh Valleys, the North West and Scotland. Others might remain in service on low revenue routes, subject to refurbishment, re-engineering and PRM-TSI.
Classes 313, 314, and 315 (75 mph Dual voltage or AC electric fleets, Sub-Group C) Built 1976 – 1981. 35-year life reached in 2011 to 2016 (CP4 and CP5)	481	A large part of the Class 315 fleet will be displaced by Crossrail, but as has been shown by Southern's Class 313s, these units may be suitable for continued use on routes such as the Welsh Valleys (after electrification) for many years, subject to refurbishment, re-engineering and PRM-TSI. Franchise bidders and funders may consider that there is a case for replacing many of these units with new or mid-life EMUs, e.g. in Wales or West Anglia, or on Thameslink Moorgate services.
Most of Class 317 (100 mph AC electric fleet, Sub-Group D) Mostly built 1981 – 1982. 35-year life reached in 2016 to 2017 (CP5)	156	Some will be displaced by new Thameslink rolling stock, but these units could be suitable for continued use on electrified routes in London & the South East, the North and Scotland for many years, subject to refurbishment, re-engineering and PRM-TSI. These EMUs and the remainder of Classes 317 to 322 (see Appendix 3) are prime candidates to prove the business case for possible replacement of existing traction equipment with three-phase traction packages, so reducing energy costs and maintenance costs. 36 vehicles were taken off lease in February 2012 at the commencement of the Greater Anglia Franchise and are not included in the current fleet totals.
Most of Class 455 (75 mph DC EMU fleet, Sub-Group C) Most built 1982 – 1984 with some trailer cars dating from 1978 – 1980 and 80 vehicles from 1985. 35-year life reached in 2013 to 2020 (CP4 and CP5)	468	The Class 455 fleet is structurally similar to the class 317 family of units. The successful interior reconfiguration of the SWT Class 455 units shows their potential. As with the Class 317 to 322 units, these are prime candidates for continued operation and re-tractioning. They could also be extended from 4-car to 5-car length with ex-Class 317 or 319 trailer cars. The 20 Class 455/9 units were built as a follow-on order in 1985 and are included in Appendix 3
Classes 507 and 508 (75 mph DC EMU fleets, Sub-Group C) Built 1978 – 1980. 35-year life reached in 2013 to 2015 (CP5)	177	These are the DC version of the Class 313/314/315 family. They are all leased to Merseyrail. Merseytravel has issued invitations to tender for their replacement but the current status of this is unclear. They may therefore either continue to operate with, or will be replaced by new trains.
IC125 HSTs and Loco-hauled mark 3 coaches (including HST power cars, class 90 electric locos, and DVTs (125/ 100 mph, Sub-Group E) Built 1975 – 1982. 30/ 35-year life was reached in 2005 to 2012 (CP3 and CP4)	1,070	A large part of this fleet will be displaced by IEP on the GWML and ECML. Some HSTs may continue to operate on Paddington – Plymouth/ Penzance services, with necessary modifications, for many years, until possibly replaced by Class 220/ 221/ 222 units cascaded from their present routes by electrification. Electrification of the MML and some Cross Country routes may also lead to further withdrawals of HSTs in CP5 and CP6. Some Mark 3 or similar vehicles may operate open access routes and some other services.

Total: 3,222 Vehicles

Appendix 3

BR Fleets Reaching Nominal Life Expiry in CP6 (30 Years for Diesel Fleets and 35 years for Electric Fleets)

Class and Build Dates	Fleet Size (Vehicles)	Comments
Classes 158 and 159 (90 mph Sprinter DMU fleets, Sub-Group B) Built 1989 – 1993. 30-year life reached in 2019 to 2023 (CP6)	447	Some will be displaced by electrification (or resulting cascades) on Great Western, the Welsh Valleys, the North West and Scotland. Options for fleet development will need to address growth, the potential for continued operation, and PRM-TSI. There may be a business case for replacing the present Voith transmissions with new gearboxes, for these and for some other DMU fleets.
Class 165 and 166 (75 and 90 mph Turbo DMU fleets, Sub-Groups A and B) Built 1991 – 1993. 30-year life reached in 2021 to 2023 (CP6)	Class 165, 177 Class 166, 63	Some will be displaced by electrification (and the resulting cascade) on Great Western. One option is that they remain in service, to accommodate growth and to provide a cascade of Class 15x vehicles, subject to necessary modifications and PRM-TSI.
Later Class 317, and all of Classes 318, 319, 320, 321, and 322 (90/100 mph Dual voltage or AC electric fleets, Sub-Group D) Built 1985 – 1990. 35-year life reached in 2020 to 2025 (CP6)	1,021	Parts of the Class 317 and 321 fleets and all of the Class 319 fleet will be displaced by new Thameslink rolling stock, but these units could be suitable for continued use on electrified routes in London & the South East, the North and Scotland for many years, subject to potential re-engineering, refurbishment and PRM-TSI. These EMUs are prime candidates to prove the business case for possible replacement of existing traction equipment with three-phase traction packages, so reducing energy and maintenance costs.
Class 442 (100 mph DC units, Sub-Group D) Built 1988 – 1989, but incorporating traction equipment dating from 1966. 35-year life reached in 2023 to 2024 (CP6)	120	These units, originally built for the Waterloo – Weymouth route and now used on Gatwick Express services, have mark 3 body shells but with completely non-standard traction equipment. They might be replaced by Class 377s cascaded by the new Thameslink fleet, or be retained in service with new traction equipment and PRM-TIS modifications. Alternatively they might perhaps be converted for loco-haulage with a new generation of electric locomotive.
Later Class 455 and all of Class 456 (75 mph DC EMU fleets, Sub-Group c) Built 1984 – 1991. 35-year life reached in 2019 to 2026 (CP6 and CP7)	128	The Class 455 and 456 fleets are structurally similar to the class 317 to 322 family of units above. The successful interior reconfiguration of the SWT Class 455 units shows their potential. As with the Class 317 to 322 units, there are options for continued service and re-tractioning. They could also be extended from 4-car to 5-car length with ex-Class 319 or 321 trailer cars.

Total: 1,956 Vehicles

Appendix 4

Principles of the High-Level Rolling Stock Strategy

1. It is proposed that the strategy will be developed to provide a general indication of the national fleet requirements over Control Periods CP5, CP6, and CP7 i.e. up to 2029;
2. It is intended that the strategy will provide a guide of future opportunities, but it will not be prescriptive. The strategy will provide a 'plain vanilla' base. Franchise bidders will develop and submit their own plans and ideas in their bids, and where these offer better value for money than the proposals in the strategy, this will put them in a good position to win franchises;
3. The strategy will incorporate known DfT, Network Rail and funder plans, drawn from RUSs and knowledge of possible renewal requirements for existing fleets, and HLOS/ SOFA factors;
4. In line with the recent Cabinet Office/BIS review of procurement strategy, the strategy will provide a high level input to the 'pipeline' of future rolling stock and refurbishment work, to help guide the supply market. It will provide as much predictability as is possible within the industry's financial framework about the size of total rolling stock budgets over 5, 10 and 15 years;
5. It will ideally be drawn up through as broad a consensus as possible, via a small secretariat working with ROSCOs, Network Rail, DfT/Transport Scotland/TfL, suppliers/manufacturers and RIA. It might also be endorsed by the Rail Delivery Group (RDG);
6. The number of vehicles, vehicle types, capabilities and route utilisation will depend crucially on the commercial terms offered by vehicle owners, suppliers and refurbishment contractors. A wide range of options and sub-options will be possible for many TOCs, including replacement of existing fleets by cascades initiated by other parties;
7. The pace and extent of electrification will be a key variable. This will have a major impact on fleet cascade opportunities;
8. Developing the strategy informed by wider strategic requirements, including depots, infrastructure and signaling, will support securing best value for money across all parts of the railway;
9. It is proposed that the strategy will be a living document, updated when franchises are re-let or electrification decisions are made or revised, and no less frequently than every six months.

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